

## THE COSTA RICAN SPECIES OF *WESMAELIA* FOERSTER WITH DESCRIPTION OF A NEW SPECIES (HYMENOPTERA: BRACONIDAE: EUPHORINAE)

SCOTT RICHARD SHAW

Department of Plant, Soil, and Insect Sciences, University of Wyoming,  
Laramie, Wyoming 82071-3354

*Abstract.*—*Wesmaelia pendula* Foerster is recorded for the first time from Costa Rica. A second species from Costa Rica, *Wesmaelia lizanoi* NEW SPECIES, is described and illustrated. A key to the two New World species is included.

*Key Words.*—Insecta, Braconidae, Euphorinae, *Wesmaelia*, Costa Rica, new species.

The genus *Wesmaelia* was described by Foerster (1862) in honor of the Belgian hymenopterist Constantin Wesmael, who made numerous contributions to our knowledge of braconid wasps during the 1830s. With its exceptionally long and slender first metasomal segment (Fig. 2), *Wesmaelia* is one of the most distinctive euphorine genera (S. Shaw 1985), but it is usually regarded as rather rare (M. Shaw & Huddleston 1991). For more than 125 years *Wesmaelia* has been known only by the type-species, *W. pendula* Foerster, but in recent years three additional species have been described in the Old World (Papp 1990; Belokobylskij 1992; Papp & Chou 1995). Only one of these four, the holarctic *W. pendula*, has been previously reported in North America (Marsh 1979). The hosts of most *Wesmaelia* are unknown, but *W. pendula* is recorded in the United States as a koinobiont endoparasitoid of the late instar nymphs and adults of nabid bugs of the genus *Nabis* (Muesebeck 1963; Marsh 1979; S. Shaw 1985, 1988, 1995; M. Shaw & Huddleston 1991).

Around 1989 I began a collaboration with Prof. Paul Hanson, of the Universidad de Costa Rica, to help develop a textbook to the Hymenoptera of Costa Rica. As a result of this effort, dozens of Malaise traps were operated at sites throughout the country, and many thousands of specimens of Braconidae were collected and prepared for study (Hanson & Gauld 1995). One of the unexpected surprises of this project was the discovery of the new species described in this paper. One male and two female specimens of *W. pendula* were also found at the Zurqui de Moravia site in San José Province, extending the known southern limit of distribution for this species from Mexico to central Costa Rica.

### MATERIALS AND METHODS

*Wesmaelia* species can be identified as members of the subfamily Euphorinae using the keys of S. Shaw (1995), Sharkey (1993), or M. Shaw & Huddleston (1991). Diagnosis of *Wesmaelia* follows that of S. Shaw (1985) and Papp & Chou (1995). Specimens can be determined as *Wesmaelia* using the keys of S. Shaw (1985), or Marsh et al. (1987). Specimens keyed through Marsh et al. (1987) will key to couplet 222. The genus is easily diagnosed by the slender first metasomal segment (Fig. 2), along with the forewing venation (as Fig. 3) with reduced M-Cu vein, strongly curved Rs, and no closed second submarginal cell.

The morphological terminology used here follows that of Shaw (1985, 1987), except for the wing venation terminology, which is adapted to conform to more recently adopted changes (Huber & Sharkey 1993). Microsculpture terminology follows that of Harris (1979). Body length was calculated by measuring from the front of the head (exclusive of the antennae) to the apex of the propodeum, and adding the measure of the metasomal length (exclusive of the ovipositor), thus avoiding the problem created by specimens that die with the metasoma flexed in various positions (see Figs. 2 & 4).

Abbreviations for specimen depositories are as follows: Rocky Mountain Systematic Entomology Laboratory, University of Wyoming, Laramie (RMSEL); Museo de Insectos, Universidad de Costa Rica, San Jose (MIUCR); and Instituto Nacional de Biodiversidad, Heredia (INBio).

#### KEY TO THE NEW WORLD SPECIES OF *WESMAELIA*

- 1a. Petiolate first metasomal tergum longer than mesosoma and strongly curved in lateral view (Fig. 2); mesosoma mostly black; females with 17–18 flagellomeres, males with 21–22 . . . . . *W. lizanoi* NEW SPECIES
- 1b. Petiolate first metasomal tergum shorter than mesosoma and less curved than in Fig. 2; mesosoma mostly orange except propodeum black; females with 25–33 flagellomeres, males with 25–29 . . . . . *W. pendula*

#### *WESMAELIA LIZANOI* SHAW, NEW SPECIES (Figs. 1–3)

*Types*.—Holotype, female; data: COSTA RICA. *SAN JOSE*: Zurqui de Moravia, 1600 m el, Oct-Dec 1990, P. Hanson, Malaise trap; deposited: Rocky Mountain Systematic Entomology Laboratory, University of Wyoming, Laramie. Paratypes: 3 females, 2 males, same data as holotype; 1 male, same data except Jan-Feb 1989; 1 male, same data except Mar 1989; 1 female, 2 males, same data except Jun 1990; 2 females, 2 males, same data except Jul 1990; 3 females, same data except Apr 1991; 1 male, same data except Jul 1991; 1 female, same data except Mar 1992; 2 females, same data except Apr 1992; 1 male, same data except May 1992; 1 male, same data except Jul 1992; 2 females, same data except Feb 1994; 3 females, same data except Apr 1994; 1 female, same data except Jun-Jul 1994; 1 female, same data except Jan 1995; 3 females, 8 males, same data except Mar 1995; 1 female, 2 males, same data except Jun 1995; 1 female, 2 males, same data except Aug 1995. 2 females, *HEREDIA*: Vara Blanca, Finca Georgina, 2100 m, Jul-Aug 1990, P. Hanson, Malaise trap; 7 females, same data except Mar-Apr 1990; 2 females, 4 males, same data except May-Jun 1990; 2 females, same data except Jul 1990. 1 female, *PUNTARENAS*: San Vito, Jardin Bot. Las Cruces, 1200 m, Dec 1988, P. Hanson, Malaise trap. Paratypes deposited: RMSEL, MIUCR, INBio.

*Description of Holotype Female*.—Body length 3.8 mm; forewing length 2.8 mm. Head as in Fig. 1, transverse, surface mostly smooth with moderately dense setae; temple highly polished and mostly devoid of setae; ocelli small, ocell-ocular distance 2.6× greater than lateral ocellus width; eyes ovoid, 1.8× taller than wide in anterior view; with inner margins nearly parallel, barely converging ventrally; antennal scape short, 1.6× longer than wide; antenna with 18 flagellomeres; basal flagellomeres long and slender, first flagellomere 5× longer than wide; apical flagellomeres more compact, apical flagellomere 1.7× longer than wide; median carina between antenna mostly effaced, indicated only

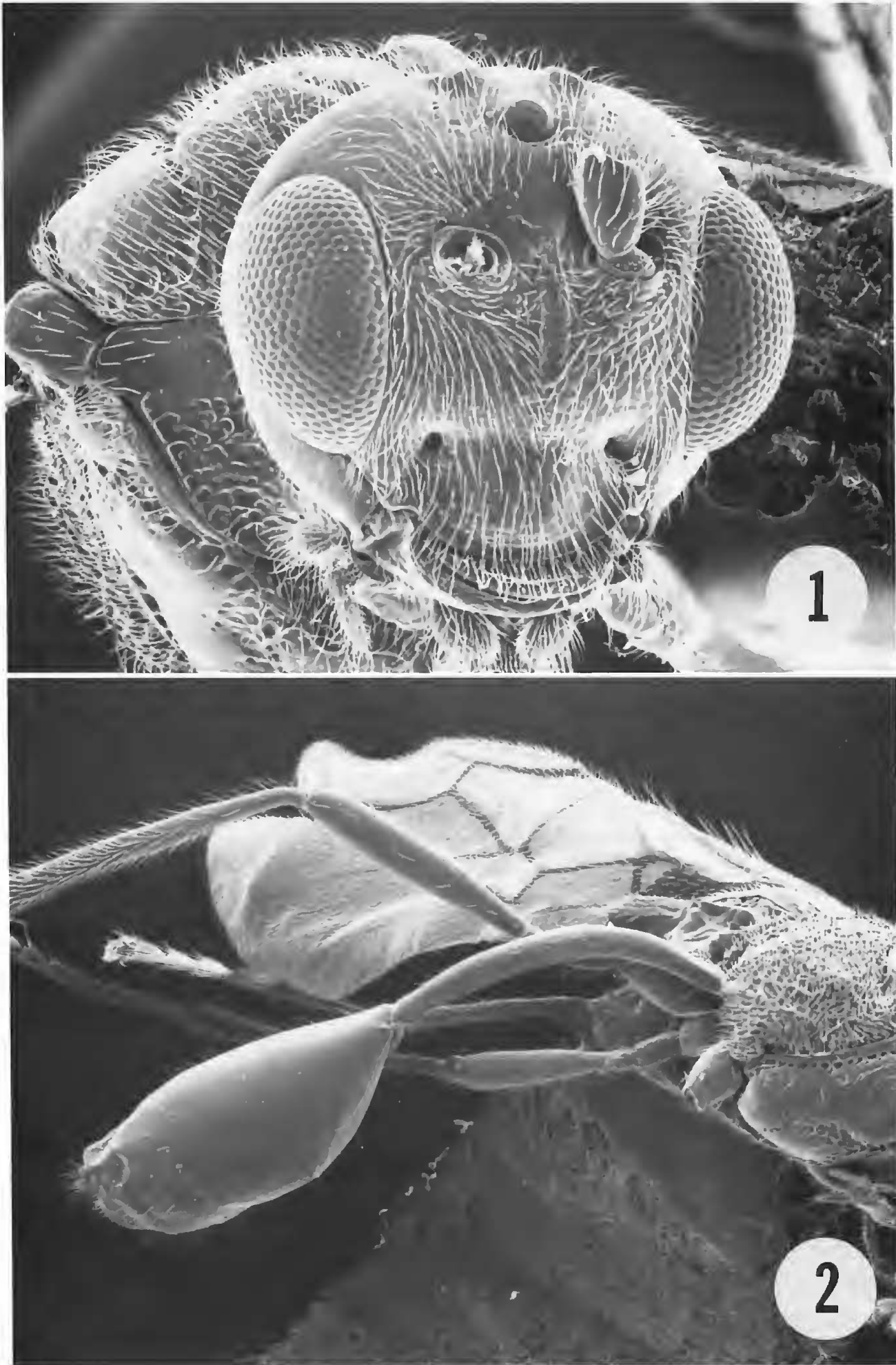


Figure 1. Head of *Wesmaelia lizanoi*, anterior view, antennae removed.

Figure 2. Posterior half of mesosoma and metasoma of *Wesmaelia lizanoi*, lateral view, right wing removed.

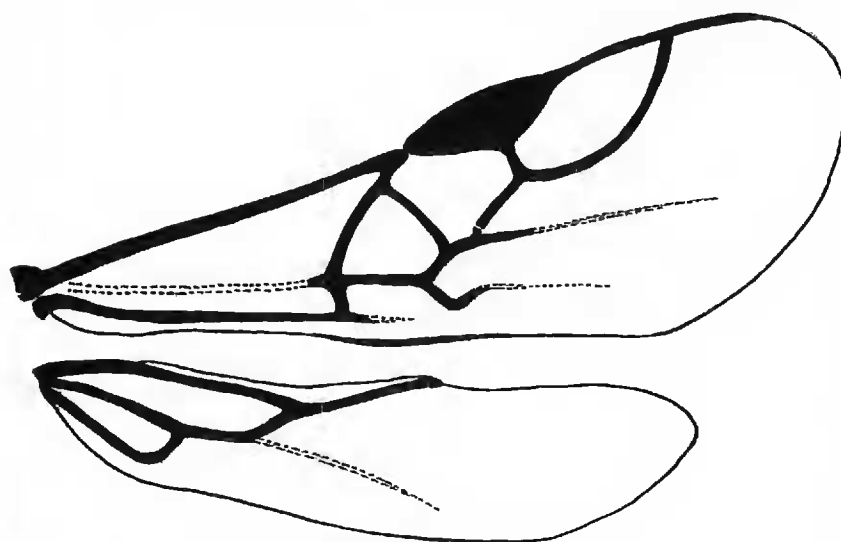


Figure 3. Wings of *Wesmaelia lizanoi*.

by trace rugulose sculpture; face  $1.9\times$  wider than tall; clypeus with lower margin rounded; malar space very narrow,  $0.9\times$  basal width of mandible; mandibles long and slender, nearly completely overlapping when closed. Mesosoma  $1.4\times$  longer than tall in lateral view; pronotum and prosternum mostly areolate-rugose; mesonotum and scutellar disc mostly smooth, except notauli foveate; mesopleuron mostly smooth and devoid of setae on medial disc, except antero-ventral sternalus foveate; propodeum deeply excavated medially; propodeal sculpture finely areolate, except smooth area dorsad metasomal insertion delimited dorsally by a transverse carina; hind tibia with apical fringe of flat setae along inner margin; wings as in Figs. 2–3; pterostigma  $2.7\times$  longer than tall; vein Rs sharply curved, meeting wing margin well before apex; length of marginal cell along wing margin  $0.75\times$  pterostigma length. Metasoma as in Fig. 2, smooth, highly polished, and mostly devoid of setae except along posterior margins of posterior segments; petiolate first metasomal segment exceptionally long and slender,  $8.4\times$  longer than midpoint width in lateral view, longer than entire mesosoma, and strongly curved in lateral view (Fig. 2); metasoma beyond petiole with 6 visible segments,  $2.7\times$  longer than tall in lateral view, terga weakly sclerotized and somewhat indented posteromedially; hypopygium truncated, finely carinate medially; ovipositor sheath  $4.4\times$  longer than tall in lateral view; needle-like tip of ovipositor just visible beyond sheath apex. *Color*: Ocellar triangle, vertex posteriorly, mesosoma, petiolate first metasomal segment, metasomal terga 2 + 3, and ovipositor sheath dark brown to black; eyes silver; antenna, remainder of head, legs, and remainder of metasoma mostly light yellow-brown; membranous parts of metasoma white; wing membrane transparent; pterostigma and wing venation pale brown.

*Diagnosis*.—*Wesmaelia lizanoi* can be distinguished from related species by its unique combination of short antennae with 17–18 flagellomeres in the females, 21–22 flagellomeres in the males, eyes barely converging ventrally (Fig. 1), the exceptionally long and slender first metasomal segment (Fig. 2), and extensive black coloration on the top of the head, the entire mesosoma, and much of the metasoma.

*Variation*.—All variation noted is based on study of the paratypes. Females with body length 3.3–4.1 mm; forewing length 2.3–2.8 mm; antenna with 17–18 flagellomeres; light-colored parts of body varying from yellow-brown to pale brown-white or white; metasoma posteriorly and ventrally infused with varying amounts of dark brown pigment. Color of the face is more pure white in specimens from Vara Blanca, as compared with those from other sites. There is substantial variation in the apparent size of the metasoma beyond the petiolate first segment (varying from  $2.7$ – $4.1\times$  longer than tall in lateral view), depending on the degree to which segments are telescoped outwards. The great length of the first metasomal segment, along with the telescoping capability of the remaining segments, allow the metasoma to swing ventrally and anteriorly, presumably allowing oviposition



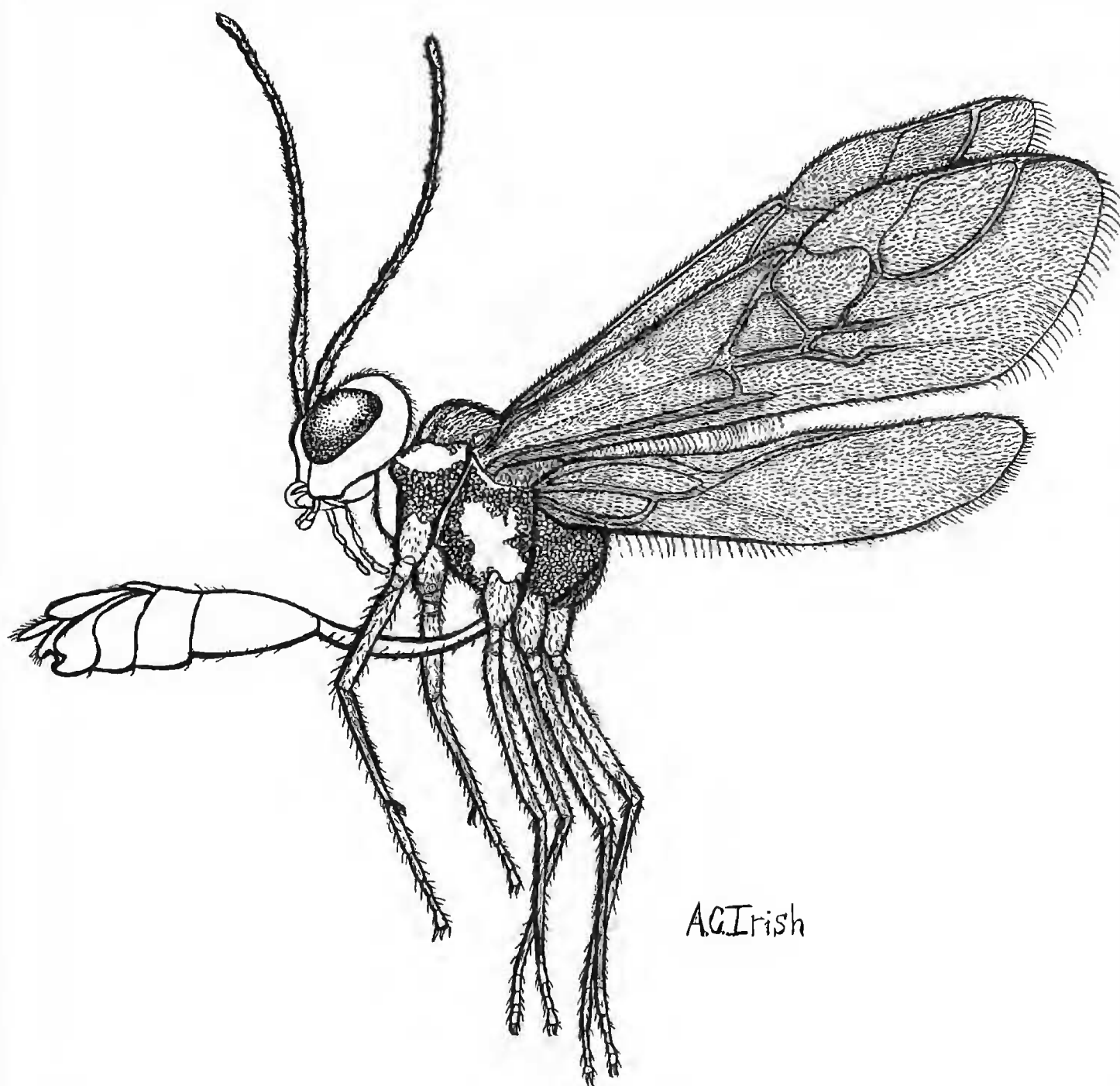


Figure 4. Lateral habitus of *Wesmaelia lizanoi* female, with metasoma advanced in ovipositional posture.

in front of the body of the wasp (Fig. 4). Several specimens died with the metasoma extended in this forward position.

Males with body length 2.9–3.7 mm; forewing length 2.4–3.0 mm; antenna with 21–22 flagellomeres; flagellum and metasoma much darker than in female, mostly dark brown to black; propodeal sculpture entirely finely areolate, lacking a smooth area above the metasomal insertion.

*Distribution.*—Known only from three Costa Rican sites in Heredia, San Jose, and Puntarenas Provinces, at elevations ranging from 1200 to 2100 meters. The site at Zurqui de Moravia is located on the main highway east from San Jose to Limon, just before the entrance to Braulio Carillo National Park, behind the La Fonda restaurant. The Zurqui Malaise trap has been situated for several years just over the crest of a grassy hill on the edge of (and overlooking) a moist primary cloud forest, rich in epiphytes. The site at Vara Blanca is located at Finca Georgina, a farm belonging to the president of the Dos Pinos dairy company. The Finca Georgina Malaise trap was situated on the edge of a strip of primary forest re-

maining in a ravine. The site at San Vito is located at the Jardin Botanica Las Cruces, also known as the Wilson Botanic Garden.

*Biology*.—The hosts of *W. lizanoi* are unknown, but if its habits are similar to *W. pendula*, then this new species also parasitizes late instar nymphs and adults of nabid bugs. Adults of *W. lizanoi* have been collected during almost every month of the year, indicating that this species is probably multivoltine.

*Etymology*.—This species is named in honor of Sr. Jorge Arturo Lizano, owner of the La Fonda restaurant, behind which the “Zurqui de Moravia” Malaise trap was situated. Through his courtesy many new insects have become known to science.

*Material Examined*.—See Types.

#### ACKNOWLEDGMENT

Special thanks to Paul Hanson for providing specimens and detailed information on the sites of the Malaise traps. Scanning electron microscopy for Figs. 1–2 was done by Paul Marsh. The habitus drawing (Fig. 4) was done by Ms. Amy Irish. This research was supported by grant DEB-930-0517 from the National Science Foundation.

#### LITERATURE CITED

- Belokobylskij, S. A. 1992. *Wesmaelia* and *Syrrhizus* species (Hymenoptera, Braconidae, Euphorinae) in the Far East. Vest. Zool., 1992: 8–16 (in Russian).
- Foerster, A. 1862. Synopsis der Familien und Gattungen der Braconen. Verh. Naturh. Ver. Preuss. Rheinl. 19: 224–288.
- Hanson, P. E. & I. D. Gauld. 1995. The Hymenoptera of Costa Rica. Oxford University Press, Oxford.
- Harris, R. A. 1979. A glossary of surface sculpturing. Occas. Pap. Entomol. 28: 1–31.
- Huber, J. T. & M. J. Sharkey. 1993. Structure. pp. 13–59. In: Goulet, H. & J. T. Huber (eds.), Hymenoptera of the World: An identification guide to families. Centre for Land and Biological Resources Research, Ottawa, Ontario. Research Branch, Agriculture Canada, Publication 1894/E.
- Marsh, P. M. 1979. Family Braconidae. pp. 144–313. In: Krombein, K. V., P. D. Hurd Jr., D. R. Smith, & B. D. Burks (eds.), Catalog of Hymenoptera in America North of Mexico. Smithsonian Institution Press, Washington, D.C.
- Marsh, P. M., S. R. Shaw & R. A. Wharton. 1987. An identification manual for the North American genera of the Family Braconidae (Hymenoptera). Mem. Entomol. Soc. Wash., 13: 1–98.
- Muesebeck, C. F. W. 1963. Host relationships of the Euphorinae (Hymenoptera: Braconidae). Proc. Entomol. Soc. Wash., 65: 306.
- Papp, J. 1990. New braconid wasps (Hymenoptera: Braconidae) in the Hungarian Natural History Museum, 1. Ann. hist.-nat. Mus. natn. Hung., 82: 175–190.
- Papp, J., & L.-y. Chou. 1995. The genus *Wesmaelia* Foerster of Taiwan (Hymenoptera: Braconidae: Euphorinae). Chin. J. Entomol., 15: 345–354.
- Sharkey, M. J. 1993. Family Braconidae. pp. 362–394. In: Goulet, H. and J. T. Huber (eds.), Hymenoptera of the World: An identification guide to families. Centre for Land and Biological Resources Research, Ottawa, Ontario. Research Branch, Agriculture Canada, Publication 1894/E.
- Shaw, M. R. & T. Huddleston. 1991. Classification and biology of braconid wasps (Hymenoptera: Braconidae). Handbooks for the Identification of British Insects, Volume 7, Part 11. Royal Entomological Society of London.
- Shaw, S. R. 1985. A phylogenetic study of the Subfamilies Meteorinae and Euphorinae (Hymenoptera: Braconidae). Entomography, 3: 277–370.
- Shaw, S. R. 1987. *Orionis*, a new genus from Central America, with an analysis of its phylogenetic placement in the Tribe Euphorini (Hymenoptera: Braconidae). Syst. Entomol., 12: 103–109.

- Shaw, S. R. 1988. Euphorine phylogeny: the evolution of diversity in host-utilization by parasitoid wasps (Hymenoptera: Braconidae). *Ecol. Entomol.*, 13: 323–335.
- Shaw, S. R. 1995. Braconidae. pp. 431–463. *In*: Hanson, P. E. and I. D. Gauld (eds.). *The Hymenoptera of Costa Rica*. Oxford University Press, Oxford.

*Received 23 May 1996; Accepted 4 Nov 1996*